Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Exploration and Discovery

THE SILOAM AND SIMPLON TUNNELS

The press is attributing to Professor Alfred Bertholet, of Basle, the statement that "Hezekiah executed exactly the same kind of tunnel as the Simplon, though perhaps on a slightly smaller scale." Professor Bertholet did not say that, but his communication to the *Neue Züricher Zeitung* of February 27, 1905, was taken up by the *London Illustrated News* and the *Scientific American*, and by other papers. The impression has been given that the Siloam may be reasonably compared with the Simplon, which is twelve and one-fourth miles long, and is so constructed as to consist of two passages fifty feet apart, executed with the best modern engineering skill. What can be truthfully said of the Siloam tunnel in comparison?

It is not essential for the purpose of this comparison to connect it with Hezekiah and the passages 2 Kings 20:20, 2 Chron. 32:30, and Sirach 48:17; but the reasoning of Sir Charles Wilson in his article on "Siloam" in Hastings' *Dictionary* is fair and sufficiently conclusive. He says: "The execution of this work may be ascribed with much probability to Hezekiah." The difference in time then is about twenty-six hundred years. We may note, in passing, that the writer on Hezekiah in Hastings is less ready to attribute this work to him, but he calls it a "work of great engineering skill." Let us examine it in the accounts of explorers.

It is perhaps first mentioned by Quaresmius[1] in his *Elucidatio Terrae Sanctae* of about 1625 A. D. He says that he saw the opening into the Pool of Siloam, and did not dare to enter it, but he afterward wrote from Venice to a priest in Jerusalem named Vinhoven to explore the passage; and he did so, though only by penetrating some distance from either end, and so not finding out whether or not he had been in parts of one passage with a continuous flow of water.

Of course, all travelers observed the Siloam end of the conduit and attributed its construction to Hezekiah, as did Felix Fabri[2] about 1480, but thorough exploration seems to have begun with Dr. Edward Robinson,[3] in 1840, who says that in the previous year doubt was felt whether the water ran north or south. Robinson, accompanied by Eli Smith, entered from the south, and found the tunnel about 2 feet wide, with about one foot of mud and water in it; and at first it was twice a man's height, but gradually became lower, until, 800 feet from the entrance, it was so low that crawling on all fours was necessary. There the two men stopped, and, marking this point with the smoke of a candle, they went back. Three days later they entered at the "Well of the Virgin," supposing, from external measurement, that they must go only half as far as at first; but the way was long, and the tunnel was low and difficult, until they came to the point previously marked. They noted that only one person could have worked in this smallest part, and that many false cuts had been abandoned. They made the whole length 1,750 feet, or about one-third longer than a straight tunnel would be. They saw from the markings that the workmen had advanced from either end and met near the center, leaving a slight error at the uniting point.

---

[1] Vol. II, p. 221.

[2] Vol. I, p. 528, in *Pilgrims Texts*, 1897.

[3] *Biblical Researches*, Vol. I, pp. 500–505.

Tobler explored the tunnel about ten years later, and others are believed to have gone through it, but it was in December, 1867, that Captain Warren, R.E., made the detailed examination described in *Recovery of Jerusalem.*[4] Entering at the Siloam end, he easily traversed 350 feet, with the height of the tunnel diminishing from 16 to 4 feet. At 450 feet a shaft leading upward was found. At 600 feet the height was only 2½ feet. At 850 feet the height above the muddy floor was 1 foot 10 inches. At 900 feet the height was 1 foot 4 inches. Two false cuttings of about 2 feet in depth were found there. At 1,050 feet the height was a foot better, but fell again to less than 2 feet at 1,100 feet. At 1,450 the height rose to 6 feet, and so the party came out at 1,708 feet. Warren made fifty-seven stations of the compass, showing irregularity of direction to the extent of fifty-seven changes.

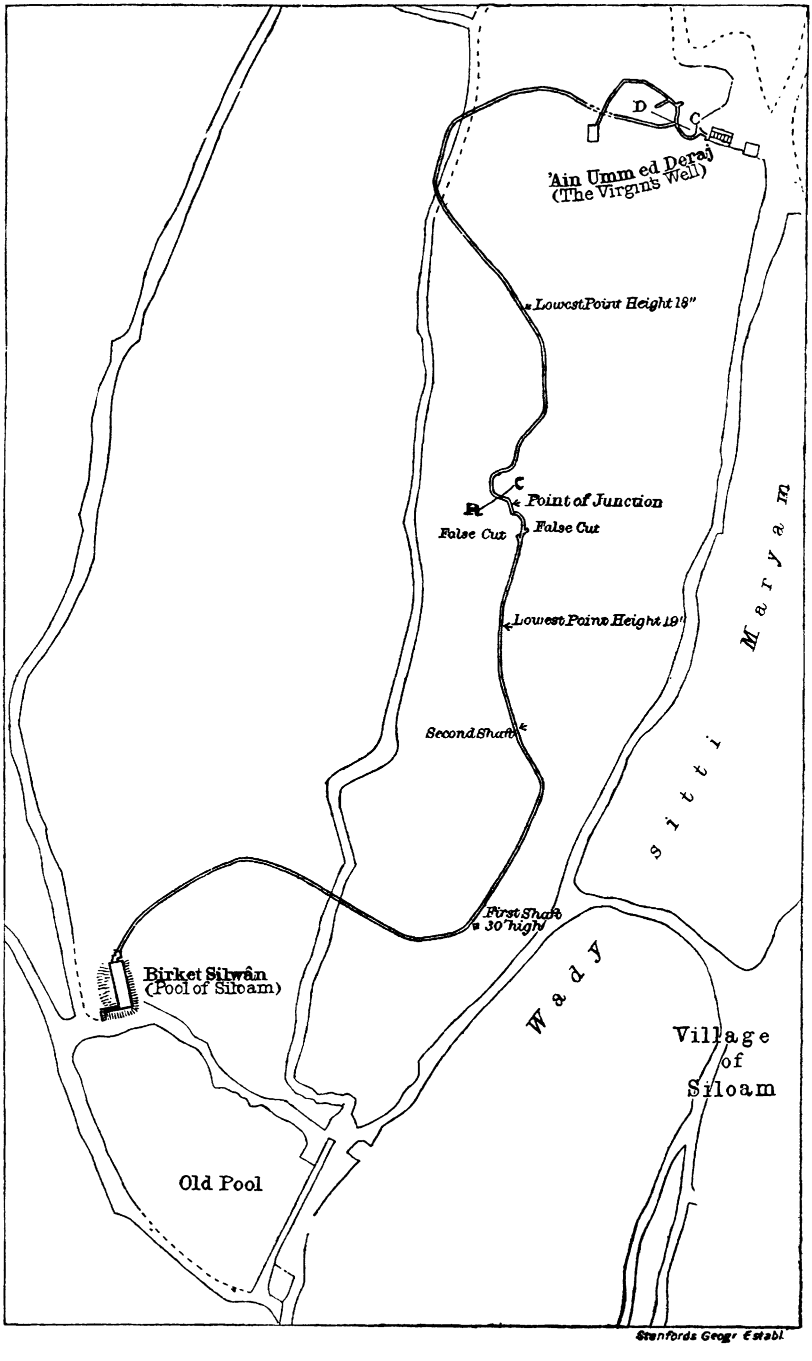
The inscription was discovered in 1880 by a boy, who called Conrad Schick's attention to it. It was at once carefully studied, and of 190 letters originally made 171 were deciphered. The only point about it to be noted here is that, although describing the meeting of the working parties, it was cut only 19 feet from the lower end. Dug out and carried off to be sold in 1891, it was brought back soon after, but broken in two pieces. It is now in the Imperial Museum at Constantinople.

This discovery led to a thorough examination by Lieutenant Conder in 1881.[5] With two companions he first spent five hours in the tunnel. His estimate of the length differed from Warren's by only 2 feet. The

---

[4] London, 1871, pp. 239–42.

[5] *Quarterly Statement, Palestine Exploration Fund,* 1882, pp. 122–31.

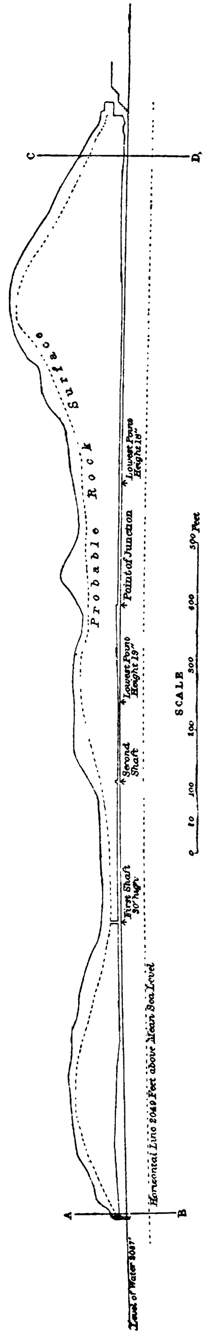


Stanfords Geogr Estabt

inscription made the length 1,200 cubits, which at 17 inches to the cubit is 1,700 feet. Conder made it 1,706.8 feet. Conder was making a plan of its course which also showed its varying heights. A second visit of four hours completed the work. He searched for, but found no other inscription. He found at 470 feet from the south end a shaft running up to the surface, and covered there with blocks. Conder noted several notches of triangular form, which might be used for lamps, or might be measuring marks.

Now as to the skill of the makers. Conder says that their "knowledge of engineering was rudimentary." The line at first wavered greatly, but from the vertical shaft northward it was straighter. He believes that this shaft was made because the men could not look back and see light. From the shaft they went very well for 140 feet, and then diverged. From the north end the error was greater. He believes that the low stretch through the middle is due to haste, and that this is probably due to the rivalry of the two parties to accomplish the greater length. They may, however, have hastened because of the approaching siege. The fall throughout the tunnel is 1 foot. The floor shows unevenness—at one point a drop of 4 inches. He believes that the southern party was 2 feet higher than the northern when they met. The great height of 16 feet at the south end may be due to cutting down the tunnel sufficiently to let the water flow. "The small bends and irregularities, not less than the larger irregularities, show that it was the work of primitive engineers, unacquainted with accurate instruments or methods of measurement." A short shaft 7 feet high at 700 feet from the south end is perhaps a safety shaft, where a man could stand during the intermittent flow of water, or while resting from his working posture.

Schick[6] took the ground that so low and narrow a tunnel could not be made, and that it must therefore have been cut down through the rock, and then roofed



---

[6] *Quarterly Statement, Palestine Exploration Fund,* 1886, p. 198.

with flat stones; but Conder[7] declared to the contrary, and no one accepted Schick's view. The author of Baedeker's *Palestine*[8] takes the view that the tunnel is "now, though not originally, of varying height," This is absurd. Another suggestion, which is wholly unreasonable, is that of M. Clermont-Ganneau,[9] that the curve near the south end is due to a skilful avoidance of the Tombs of the Kings, which will therefore be found at the center of this curve. An American, learning of this idea, offered to pay the expense of sinking a diamond drill at that point, but nothing came of his offer, and for once M. Clermont-Ganneau seems to have erred.

The result of comparing the two tunnels, Siloam and Simplon, is simply to show the difference between an unscientific age and a scientific one, between an engineer of 700 B. C. and one of 1900 A. D. Professor Bertholet asks: "How did these old-time engineers gauge their direction, recognize and remedy their errors of alignment?" We have seen that they wandered almost hopelessly, save as one shaft and the sound of the tools helped them. "There is nothing new under the sun," says the Preacher; but that is not true. There are several things not known to Hezekiah's time, and one of them is a railroad tunnel through a mountain over 12 miles long, 7,000 feet below its summit, and made with hydraulic boring-machines, liquid-air explosives, and locomotives to carry out the fragments of stone, and 3,000 men at work. Yet there was probably as much joy felt at the ultimate success of the first work as we have had over the last; and no one will be disposed to speak scornfully of the Siloam engineer, even though no good is done by extravagant praise of him.

THEODORE F. WRIGHT.

CAMBRIDGE, MASS.

---

[7] *Quarterly Statement, Palestine Exploration Fund*, 1887, p. 104.

[8] Ed. 1898, p. 97.

[9] *Recueil d'archéologie orientale*, Vol. II, pp. 254–94.